480555

FLOOD INSURANCE STUDY

CITY OF GREGORY, TEXAS
SAN PATRICIO COUNTY

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Gregory, San Patricio County, Texas, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Gregory to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Espey, Huston & Associates, Inc. for the Federal Insurance Administration, under Contract No. 4786. This study was completed in October 1979.

1.3 Coordination

A meeting held in Aransas Pass on May 4, 1978 was attended by officials of the City of Gregory, a representative of the FIA, and a representative of Espey, Huston & Associates, Inc. The meeting was held to explain the nature and purpose of the study, the scope and limits of the work, and to obtain any available flood information relevant to the study. A subsequent meeting was held with the City Administrator on December 6, 1978 to discuss flood prone areas and obtain flood information currently available concerning the community.

The U.S. Geological Survey (USGS) district office in San Antonio was contacted on the availability of stream gaging stations within the study area. There are no stream gaging stations located within the study area.

The U.S. Army Corps of Engineers (COE), Hydrology Division Office in Galveston, Texas, and the Texas Department of Water Resources were contacted to provide available flood information pertinent to the City of Gregory, however, no flood data applicable to the study area was found.

The San Patricio County Drainage District located in Sinton was contacted to provide available information on flood control measures within the study area. All information pertinent to this study is included in the report.

On May 27, 1980. the results of the study were reviewed at the final meeting attended by representatives of the study contractor, FIA, and community officials. The study was acceptable to the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Gregory, Texas. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through December 1983.

2.2 Community Description

The City of Gregory is located in eastern San Patricio County, Texas in the geographic area known as the Gulf Coastal Bend. Gregory is approximately 12 miles north of the City of Corpus Christi in Nueces County, along U.S. Highway 181. Intersecting the southern corporate limits of Gregory is U.S. Highway 181, turning northwest towards Sinton, and State Highway 35, turning east-northeast for Aransas Pass. Spur 202, which passes through the northern sector of Gregory, connects U.S. Highway 181 and State Highway 35, thus forming a triangle of three major roadways within the corporate limits. From Spur 202, FM Highway 136 provides access to the north and the resort community of Bayside on Copano Bay, as well as the City of Woodsboro in Refugio County. The Southern Pacific Railroad crosses through the City of Gregory in two directions with a set of railroad tracks entering the city from a southerly direction, intersecting a set of tracks that parallels Spur 202 through north Gregory.

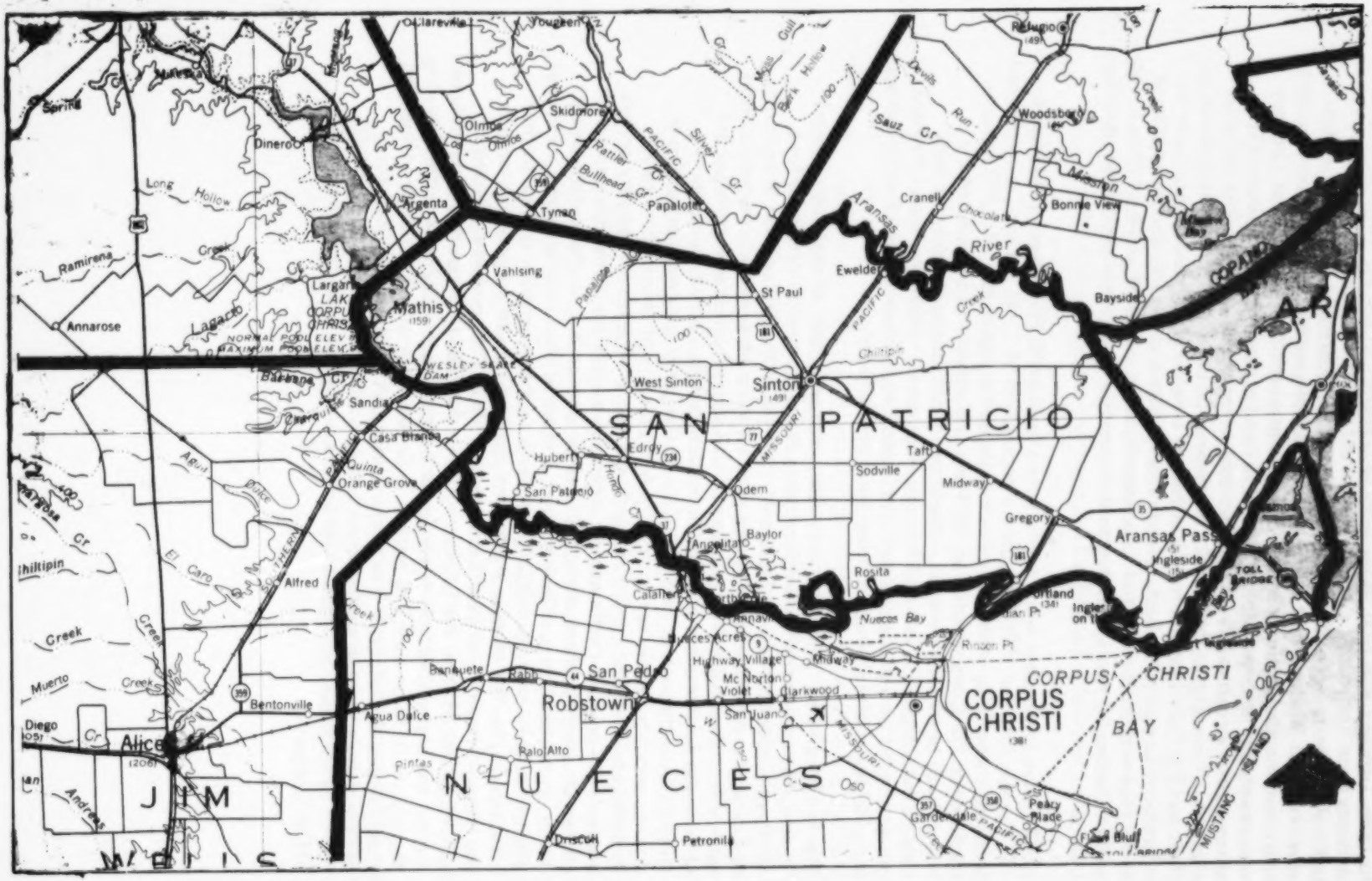


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GREGORY, TX

[illegible]

APPROXIMATE SCALE

8 0 8 16 [illegible]

VICINITY MAP

In 1886, Gregory was first designated as a station in the San Antonio and Aransas Pass Railroads. Gregory remained a small farming community until oil deposits were located in the region in 1920's and 1930's. The Midway and East Whites Point Oilfields were subsequently developed and brought more commercial activity into the local communities. The City of Gregory was eventually incorporated in June 1951 and presently encompasses 672 acres with approximately 2080 additional acres under extraterritorial jurisdiction. Proximity to the rapidly expanding Cities of Corpus Christi, Aransas Pass and Portland is expected to influence community growth patterns in the vicinity of Gregory. In fact, a large tract of land along the southeast side of State Highway 35 is expected to be developed as a site of several office buildings within the next 5 years, which would ultimately invite new residential developments.

In 1975, ten businesses were credit rated by Dunn & Bradstreet (Reference 1). Census data for 1970 indicated a population of 2,246 persons, a 14 percent increase over 1960, when the census indicated a population of 1,970 persons (Reference 2). Census data for 1950 was unavailable because Gregory had not yet been incorporated. Many residents commute daily to their jobs in the Corpus Christi and Aransas Pass areas. However, some residents are employed by local businesses and industries, including HNG Petrochemicals, Inc., Reynolds Metal, Inc., and the Sun Oil Company.

The topography of Gregory is very flat, characteristic of the Gulf Coastal Prairie, with a common elevation inside the corporate limits of 30 feet National Geodetic Vertical Datum of 1929 (NGVD). The soils in the vicinity of Gregory are black clays and are very slowly permeable with a percolation rate of less than 0.6 inches per hour. Although situated along the border of both the San Patricio and Chiltipin Watersheds, no natural creeks or streams flow through or near the City of Gregory. Unimproved drainage ditches serve to retain and carry limited amounts of stormwater runoff in southerly directions. Natural drainage in the vicinity of Gregory occurs generally in an east-northeasterly direction except for the southeastern corner of Gregory where a moderate slope occurs in a south-southeasterly direction toward Corpus Christi Bay. A channel that begins on the northwest side of Gregory near Spur 202 flows south to the southwest corner to the city, passing by the sewage treatment plant. From this southeast location the channel flows in an east-southeasterly direction, passes underneath U.S. Highway 181 and the Southern Pacific Railroad. From this road embankments, the channel flow is easterly for approximately 1/2 mile before turning sharply south to an eventual outfall in Green Lake which is tidally influenced from Corpus Christi bay. The major channel is used primarily to carry off the city's treated wastewaters but in addition serves as the outfall for all other drainage ditches and sewers as well as field and street runoff in Gregory.

The average annual rainfall, based on the 29-year record from 1931 to 1960 of the Offical Weather Station for the San Patricio County in Sinton, is 30.6 inches (Reference 3). May, August, and September are the months when the heaviest rainfall occurs in the Sinton area with a mean minimum of 3.0 inches per month. The average annual temperature recorded in Sinton for the 29-year record from 1941 to 1970 is 70 degrees F. Temperatures recorded over a 19-year period in Sinton indicate that January is the coldest month of the year with a mean temperature of 44 degrees F, and that July is the hottest month of the year with a mean temperature of 95 degrees F. The highest temperature recorded in 19 years in Sinton is 107 degrees F and the coldest temperature is 11 degrees F (Reference 4).

2.3 Principal Flood Problems

The severity of flooding problems for the City of Gregory is historically influenced by a combination of factors. A major flood hazard for the community is the inadequacy of the wastewater channel in serving as primary drainage outfall for city runoff during a rainfall event. The channel water's high nutrient levels induce heavy growth of bankside vegetation and water hyacinth which retard stream flow. Over the years, overland runoff from rainfall events has induced soil erosion and deposited silt all along the bottom of the channel, reducing the channel's load capacity for runoff volumes. The culverts underneath U.S. Highway 181 and the Southern Pacific Railroad tracks restrict stream flow of the channel during a rainfall event because they are not wide enough nor are they maintained on a regular basis. The 26-foot high dam located at the outfall of the channel on the shore bluff of Green Lake has historically caused water to back up behind it, aggravating flooding in the area upstream of the dam.

All of the culverts under the major roadways , and railroad embankments inside the city are flood hazards because they have not been maintained clear of silt and debris. The drainage ditches and storm sewers that carry stormwater runoff from the central neighborhoods of Gregory have not been maintained and are thus clogged, forcing runoff to collect in streets, yards, and basements. Heavy rainfalls associated with Hurricane Fern in September 1971 caused first floor flooding in central Gregory where the overstand and ditch runoff couldn't flow freely past the railroad embankments or fast enough through the culverts.

An unimproved drainage ditch that lacks an outfall parallels the north side of Spur 202 and serves to retain small amounts of stormwater runoff but is incapable of draining north Gregory during a moderate to heavy rainfall event.

2.4 Flood Protection Measures

The San Patricio County Drainage District plans to construct a major drainage lateral as outfall for north Gregory within the next five years, as soon as easements are acquired. The present channel is scheduled for extensive cleaning operations in 1980 and in addition will be widened at certain locations by the San Patricio County Drainage District. Water flow at the channel outfall has been somewhat improved by removing one 4-foot tile section from the drop inlet at the Green Lake Dam, lowering the dam section to a height of 22 feet.

In 1977 Gregory received a quarter of a million dollar grant from the Department of Housing and Urban Development (HUD) for neighborhood drainage projects. Improvements included cleaning and repairs to the city's sewers as well as ditch cleaning and widening in the central and southwest neighborhoods of Gregory. A greater retention capacity of the improved ditches and sewers has been noted and drainage has been significantly improved in southwest Gregory. However, water flow in ditches from central neighborhoods remains poor while culverts underneath roads and railroad tracks are small and clogged. The drainage ditches of north Gregory will not be improved until the San Patricio County Drainage District provides the outfall for area runoff.

The Texas Highway Department has scheduled road improvements for Gregory and the vicinity to take place over the next five to ten years. Improvements will include the widening and repaving of main lanes, construction of new roadside drainage ditches, construction of overpasses installation of new culverts where specified, and landscaping which will control overland runoff and erosion. In October 1979 the Texas Highway Department plans to begin the construction of State Highway 35 overpass over U.S. Highway 181 and the railroad for traffic from Aransas Pass to Corpus Christi. The main lanes of State Highway 35 in southeast Gregory will be improved. The rebuilding of the main lanes of U.S. Highway 181 in southwest Gregory and the construction of an overpass at its intersection with Spur 202 is planned to begin within the next five to ten years. In 1980, the Texas Highway Department plans to begin road improvement on U.S. Highway 181 between Portland and Gregory. Road work on Spur 202 is planned in connection with improvements to State Highway 35 and will be phased over several years.

Aside from planned drainage improvements associated with roadwork, the Texas Highway Department has no immediate plans to clean culverts and roadside ditches. The Gregory City Manager reports that funds will not be allocated on an annual basis for drainage system maintenance but would be made available for critical but minor improvements.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, and 500-year period (recurrence intervals), have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50 year period is about 40 percent (four in 10), and for any 90 year period, the risk increases to about 60 percent (six in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail in the community.

Flood discharges for the Drainage Ditch were based on the USGS open-file report 77-110 "Technique for Estimating the Magnitude and Frequency of Floods in Texas," a regional method based on regression analysis. The method relates the peak discharge at various recurrence intervals to the drainage area and channel slope (Reference 5). Peak discharges greater than the100-year event were determined by straight line extrapolation of the data on log-probability paper.

The peak discharge-drainage area relationships for the Drainage Ditch are presented in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
DRAINAGE DITCH					
Sunset Road	1.59	320	460	510	660
Southern Pacific Railroad	5.67	780	1,220	1,390	1,890
Cross Section E	5.91	810	1,250	1,430	1,980
Cross Section D	6.42	850	1,340	1,530	2,130
Cross Section B	7.26	930	1,470	1,680	2,350
Cross Section A	7.72	970	1,540	1,770	2,460

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the flood sources.

Cross sections for the backwater analyses of the Drainage Ditch were obtained by field measurement. Dimensions of all bridges and culverts were obtained by field measurement and field checked to verify structural geometry.

The locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For streams for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

The channel roughness coefficients (Mannings "n") used in the hydraulic computations were chosen by engineering judgement and based on field inspection of the stream and flood plains at each cross section. Roughness coefficients of 0.04 to 0.045 were used for the main channel of the Drainage Ditch, and roughness coefficients of 0.06 to 0.10 were used for the overbanks.

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the COE HEC-2 step-backwater computer (Reference 6). The starting water-surface elevations for the Drainage Ditch were calculated using the slope-area method. Water-surface profiles were drawn showing computed water-surface elevations determined to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Areas affected by the 100- and 500-year flood were outlined by using the width and water-surface elevation at each surveyed cross-section and interpolating the width and elevation between sections using water-surface profiles and USGS topographic quadrangle maps.

All elevations are referenced from the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Mean Sea Level Datum of 1929. Elevation reference marks used in this study are shown and described on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if the hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the flood elevations at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 5 feet (Reference 7). In cases where the 100-year and the 500-year boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2).

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FT.)	SECTION AREA (SQ. FT.)	MEAN VELOCITY (F.P.S.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
Drainage Ditch								
A[2]	0	210	1,316	1.3	18.0	18.0	19.0	1.0
B[2]	3,000	131	510	3.5	19.1	19.1	19.7	0.6
C[2]	3,600	63	320	5.3	20.4	20.4	20.6	0.2
D[3]	7,200	70	419	3.6	26.2	26.2	26.2	0.0
E[3]	9,950	293	829	1.7	27.9	27.9	28.3	0.4
F[3]	13,210	60	451	3.1	29.8	29.8	30.8	1.0
G	13,400	74	622	2.2	30.1	30.1	31.1	1.0
H	15,600	462[4]	1,063	0.5	31.3	31.3	32.0	0.7
I	16,150	448[4]	1,292	0.4	31.4	31.4	32.2	0.8
J	17,400	1,513	4,758	0.0	31.4	31.4	32.2	0.8

[1]Feet above mouth
[2]Outside corporate limits; not shown on map
[3]Outside corporate limits
[4]Floodway extends beyond corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GREGORY, TX

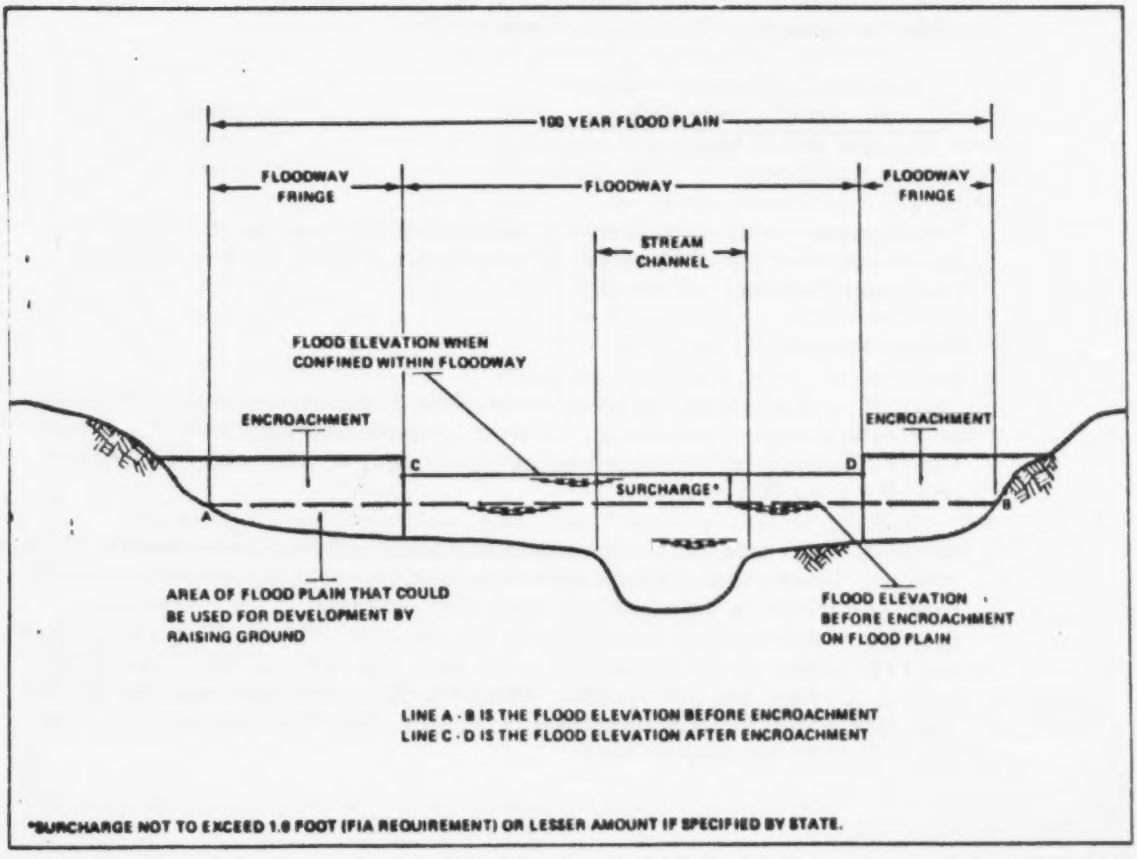
(SAN PATRICIO CO.)

FLOODWAY DATA

DRAINAGE DITCH

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway widths were determined at cross sections; between cross sections, widths were interpolated and boundaries drawn. In cases where the floodway and the 100-year boundaries are close together, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting the community.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot

Two reaches meeting the above criteria were required for the flooding sources of the City of Gregory. The location of each reach is shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire City of Gregory was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zones A2, A4:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone AH:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no Flood Hazard Factors are determined.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevation for each flooding source studied in detail in the community.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Drainage Ditch							
Reach 1	0001	-1.8	-0.4	+1.1	020	A4	Varies
Reach 2	0001	-0.8	-0.2	+0.4	010	A2	Varies
Shallow Flooding Area (Ponding)	0001	*	*	*	*	AH	32

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT-SEE MAP

*Not determined for Shallow Flood Area

TABLE

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GREGORY, TX

FLOOD INSURANCE ZONE DATA

DRAINAGE DITCH - SHALLOW FLOODING AREA (PONDING)

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the the City of Gregory is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

Flooding problems in the City of Gregory were reported and analyzed in one local and two regional studies. A Comprehensive Plan for the Town of Gregory and An Urban Drainage Study for the Coastal Bend Region of Texas (Reference 3) were both conducted by and for the Coastal Bend Council of Government in 1973. The Chiltipin Watershed Protection, Flood Prevention and Agricultural Water Management Project for San Patricio County, Texas (Reference 8) was prepared by Lockwood, Andrews & Newman, Inc., Consulting Engineers in October 1969 for the San Patricio County Commissioner's Court. The data presented here is authoritative for purposes of the Flood Insurance Program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Federal Emergency Management Agency, Insurance and Mitigation Division, Federal Center, Denton, Texas 76201.

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SAN PATRICIO CO.

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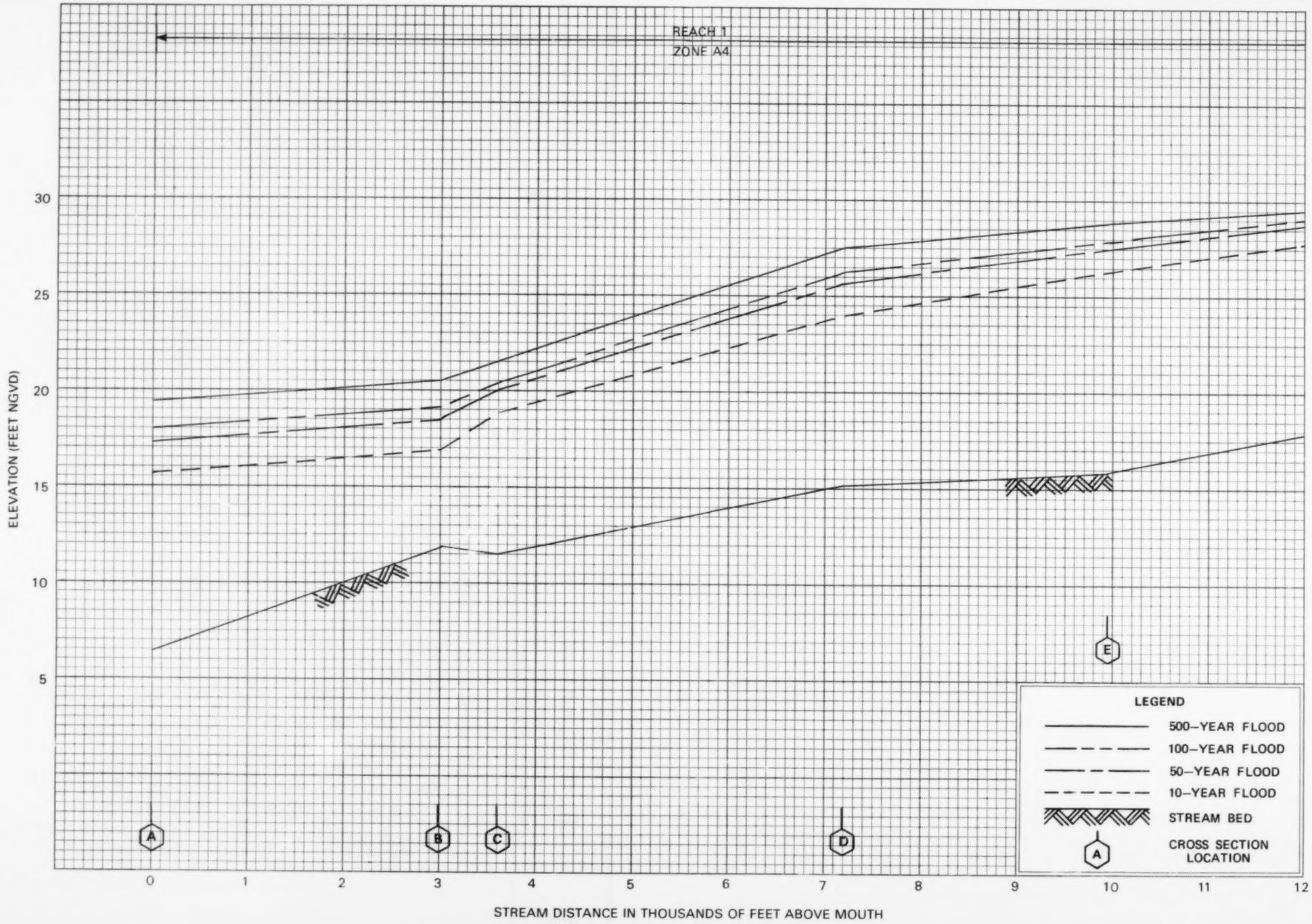


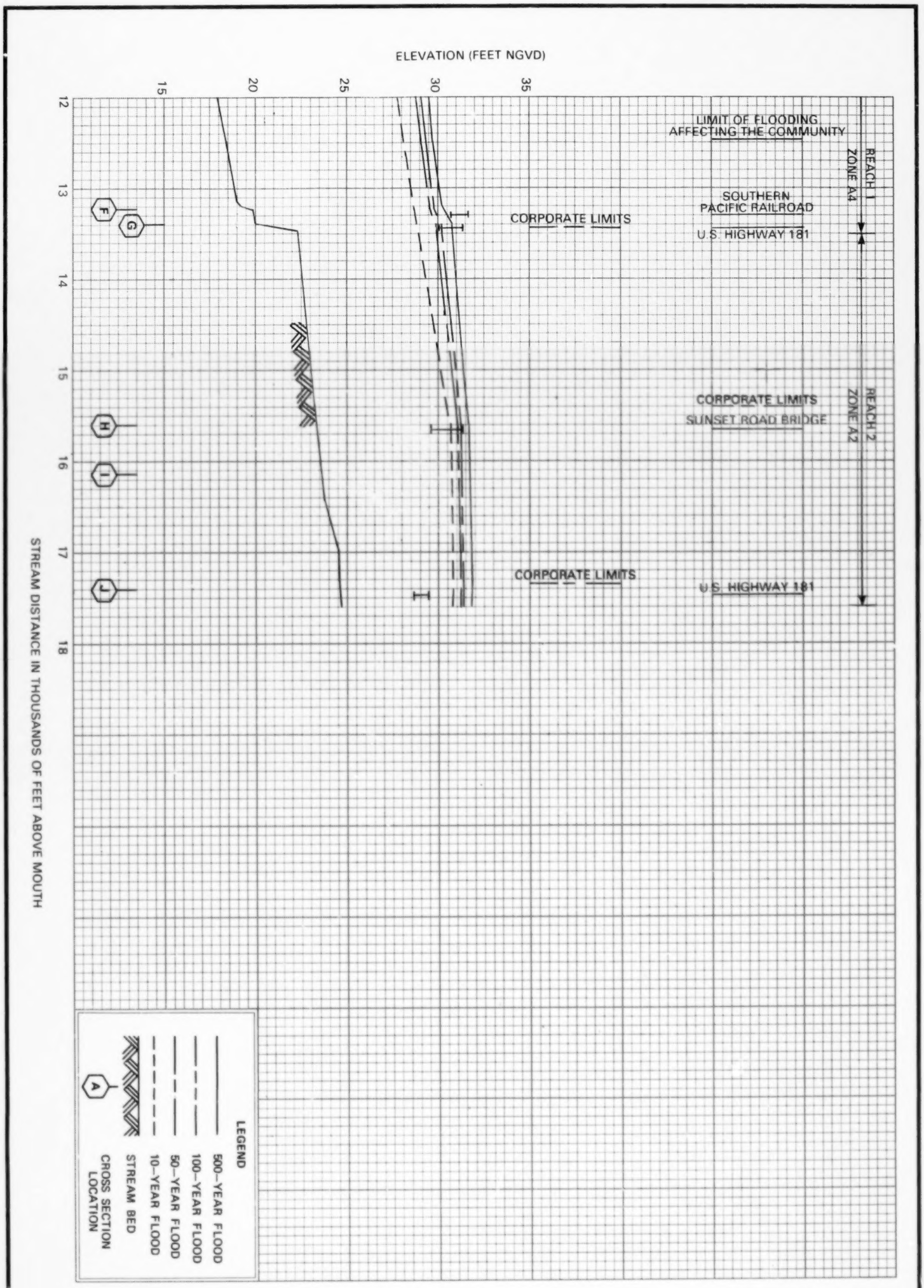
FLOOD PROFILES

DRAINAGE DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GREGORY, TX
(SAN PATRICIO CO.)

01P



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FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF GREGORY, TX
(SAN PATRICIO CO.)

FLOOD PROFILES

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